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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/272,404
Filing Date: March 19, 1999
Appellant(s): MIYATA ET AL.

MAILED
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GROUP 2600

Paul I. Kravetz
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/24/04.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 1, 5, 7-8, 11-14, 16-17, 9-20, 21-27, and 33 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

The rejection of claims 28-29, 31-32, 35, and 37 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

The rejection of claims 6 and 18 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

The rejection of claims 38, 39, and 15 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,608,561	***Marcuse***	***3-1997***
6,005,890	***Clow***	***12-1999***
5,420,868	***Chraplyvy***	***5-1995***

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 5-8, 11-12, 15-20, 22, 25-29, 31-33, 35, and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marcuse (U.S. Patent No. 5,608,561) in view of Clow (U.S. Patent No. 6,005,890).

Regarding Claims 1, 11, 12, 22, 26, 27, 31, 33, and 39, Marcuse teaches an apparatus comprising: an optical transmitter comprising a light source emitting a light (reference numeral 120 in Figure 1B), a modulation signal generator (reference numeral 150 in Figure 1B) generating an electrical modulation signal having a corresponding rise time and fall time (inherent), an adjusting circuit (reference numeral 160 in Figure 1B) adjusting at least one of the rise time and fall time of the electrical modulation signal (column 3 lines 18-36), and a modulator (reference numeral 130 in Figure 1B) modulating the emitted light with the adjusted electrical modulation signal, the optical transmitter transmitting the modulated light to an optical transmission path (reference numeral 140 in Figure 1B). Marcuse differs from the claimed invention in that Marcuse fails to specifically teach a receiver receiving the transmitted, modulated light through the optical transmission path wherein the adjusting circuit adjusts at least one of the rise time and fall time in accordance with characteristics of the modulated light at a receiver. However, one skilled in the art would clearly have recognized that in order to maximize the benefit of the transmitter taught by Marcuse, it would have been beneficial to monitor the transmitted signal at a receiver, using the information observed at the receiver to make adjustments at the transmitter, thereby allowing the transmitted signal to be optimized for the transmission path. Furthermore, Clow teaches a monitoring and feedback system wherein the transmission of a signal is monitored at a receiver, wherein the information obtained is used

to make adjustments to at least one of the rise time and fall time in the system via a feedback signal to the transmitter (see abstract), thereby optimizing the system. This disclosure by Clow would have suggested to one skilled in the art that it would have been possible to have made adjustments to one of the rise time or fall time via an adjustment circuit within the transmitter of Marcuse. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have monitored a signal transmitted to a receiver as taught by Clow to maximize the benefit of the transmitter taught by Marcuse by using the information obtained at the receiver to make adjustments to one of the rise time and fall time in the system via a feedback signal to the transmitter.

Regarding Claims 16, 28, 35, and 37, the combination of Marcuse and Clow teaches or suggests an apparatus wherein the optical transmitter comprises: a light source emitting a light (reference numeral 120 in Figure 1B of Marcuse); a modulation signal generator generating an electrical modulation signal a having a corresponding rise time and fall time (reference numeral 150 in Figure 1B of Marcuse); an adjusting circuit adjusting at least one of the rise time and fall time of the electrical modulation signal (reference numeral 160 in Figure 1B, column 6 lines 9-18) in accordance with the characteristics of the modulated light received at the receiver through an optical transmission path (as would have been suggested to one skilled in the art as discussed in claim 1); and a modulator modulating the emitted light with the adjusted electrical modulation signal (reference numeral 130 in Figure 1B), to thereby produce said signal light having at least one of the rise time and fall time of the signal light adjusted (column 3 lines 18-36).

Regarding Claims 6 and 18, the combination of Marcuse and Clow suggests an apparatus as in claims 1 and 16, but differs from the claimed invention in that Marcuse fails to specifically

teach that the adjusting circuit lengthens both the rise time and the fall time. However, one skilled in the art would clearly have recognized that one method of lengthening both the rise and fall time of the signal would have been to manipulate the values of the components that comprise the filter matching circuit used by Marcuse (reference numeral 160 in Figure 1B and Figure 2). Furthermore, Clow teaches lengthening both the rise and fall time of an input signal (column 2 lines 6-10). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have lengthened both the rise and fall time of the signal, in order to compensate for the presence of transient noise.

Regarding Claims 7, 17, 19, and 29, Marcuse teaches an apparatus as in claim 1, wherein the adjusting circuit shortens both the rise time and the fall time (column 3 lines 34-36).

Regarding Claims 8 and 20, the combination of Marcuse and Clow suggests the limitations of claim 1 and 16 including adjusting both the rise time and the fall time of a signal. Marcuse fails to specifically teach making the adjustment in order to maintain amplitude deterioration and phase margin of the transmitted signal light within a specific range. However, making adjustments to the rise and fall time of the signal would have inherently resulted in changes to the amplitude deterioration and phase margin of the signal. Furthermore, one skilled in the art would clearly have recognized that as a result of the inherent effect on a signal observed by adjusting both the rise and fall time of a signal, maintaining the amplitude deterioration and phase margin of the signal within a specified range since could have been accomplished by trial and error in making the adjustment to the transition time is the signal.

Regarding Claims 15 and 38, the combination of Marcuse and Clow suggests the claimed invention except for having a plurality of said optical transmitters, each transmitting having a

respective modulated light having a different wavelength than the modulated lights of the other optical transmitters; and an optical multiplexer multiplexing the modulated lights together into a wavelength division multiplexed (WDM) signal which is transmitted through the optical transmission path. It would have been obvious to one of ordinary skill in the art to have replicated the device of Marcuse and Clow so that each of the plurality of lasers produced a distinct wavelength, then multiplexing those distinct wavelengths via a wavelength division multiplexer to produce a wavelength division multiplexed signal, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co., 193 USPQ 8.* Furthermore, Official Notice is taken that multiplexing of a plurality of signals having distinct wavelengths is well known in the art and would have been an obvious improvement to the system of Marcuse for one skilled in the art , thereby allowing one skilled in the art to increase the amount of information transmitted.

Regarding Claims 25 and 32, the combination of Marcuse and Clow teaches a filter filtering the electrical modulation signal, but differs from the claimed invention in that the combination of references fails to specifically teach an electrical amplifier amplifying the electrical modulation signal prior to filtering. However, Official Notice is taken that it is well known in the art to amplify a signal prior to filtering it. Furthermore, one skilled in the art would have recognized the by amplifying a signal prior to filtering it, the noise along with the signal would be amplified, thereby making it easier for a filter to filter out the noise and output the desired signal. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have amplified the modulation signal prior to filtering it via an amplifier in order to ease the process of filtering the signal.

3. Claims 13, 14, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marcuse in view of Clow and Chraplyvy (U.S. Patent No. 5,420,868).

Regarding Claim 13 and 23, the combination of Marcuse and Clow teaches or suggests the limitation of claims 3 and 16, but differs from the claimed invention in that it fails to specifically teach that the modulator modulates the emitted light via one of the group consisting of optical phase modulation and optical frequency modulation. However, such modulation techniques are extremely well known in the art and would have been obvious to one skilled in the art, being that Marcuse teaches modulation of an optical signal. Furthermore, Chraplyvy teaches that it is well known in the art to use phase modulation in a system that modifies a modulation signal (see Figure 1). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modulated the signal emitted by the device of Marcuse according the phase modulation techniques taught by Chraplyvy.

Regarding Claims 14 and 24, Chraplyvy also teaches a dispersion compensator compensating for wavelength dispersion characteristics of the optical transmission path (reference numeral 19 in Figure 2).

(11) Response to Argument

At the outset the examiner would like to note that throughout the appeal brief the applicant attacks the references individually even though it has been established that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The examiner's rejection relies

on the a combination of references and what those reference may have suggested to one skilled in the art at the time the invention was made.

Marcuse discloses a discovery that a reduction in the transition times of a pulse, e.g. rise time and fall time, significantly reduces the amount of chirp in a modulated signal thereby allowing a signal to propagate further along a dispersive medium such as fiber. Marcuse implements the disclosed invention in two manners. The first is by coupling a high-bandwidth driver directly to a modulator to ***provide*** information signals with pulses having decreased rising and falling pulse transitions. The second is by coupling an electric signal generator to a high-pass filter wherein the high-pass filter acts to decrease the rising and falling pulse transition times (see "Summary of the Invention" in Marcuse).

Clow, in the same general field of communication systems and in the more specific field of pulse transition time adjustment, discloses a monitoring and feedback method wherein the transmission of a signal is monitored at a receiver, and wherein the information obtained is used to make adjustments to at least one of the rise time and fall time of the information signal at the transmission end of the system via a feedback signal to the transmitter (see abstract). Clow performs this method in order to enhance transmission quality.

The examiner has taken the position that one skilled in the art, in appreciating the disclosures of both Marcuse and Clow, would clearly recognize the ability to make adjustments to the rising and falling pulse transition times at a transmitter via a feedback method from the receiver end. The examiner bases this conclusion on Marcus' disclosure of a circuit that ***provides*** a pulse having decreased rising and falling pulse transition times and Clow's disclosure of a feedback system which provides feedback to transmitter circuitry from the receiving end of

a communication system for the purpose of adjusting the at least one of the rise and fall time of the transmitted signal. The examiner believes that one skilled in the art, having appreciated Marcuse's discovery that reduction in the rising and falling pulse transition times would result in a reduction of pulse spread at the receiving end, would have sought a means or method for monitoring the pulse spread of the signal received at the receiving end of the system and a means or method for utilizing a feedback concerning the pulse spread of the signal at the receiving end of the system to dynamically adjust the rising and falling pulse transition times provided at the transmitter of Marcuse. Having turned to the disclosure of Clow for guidance on feedback from a receiver in making adjustments to rising and falling pulse transition times, the examiner believes that one skilled in the art would have recognized that it would have been possible to employ a feedback system such as that taught by Clow in order to dynamically adjust the rising and falling pulse transition times of the signals at the transmitter of Marcuse. The examiner believes that one skilled in the art would clearly have recognized that both Marcuse and Clow disclose transmitter circuitry that provides signals having reduced rising and falling pulse transition times, while Clow provides a feedback from the receiving end of the system connected to the transmitting circuitry of the transmitter for dynamically adjusting the rising and falling pulse transition times of the signal to be transmitted based on the signal already received at the receiving end of the system. Furthermore, Clow suggests that the feedback method disclosed could be used to upgraded existing systems to make it possible to dynamically alter transmission parameters so as to achieve optimal transmission given the characteristics of the medium (column 3 lines 15-20).

Furthermore, both Marcuse and Clow seek a common goal in reducing the rising and falling pulse transition times. Marcuse seeks to reduce the rising and falling pulse transition times in order to reduce chirp in a modulated optical signal and thereby reduce the amount of pulse spreading (e.g. distortion of the pulse) as the modulated optical signal is transmitted across the network (see "Background of the Invention" in Marcuse). Likewise, Clow seeks to reduce the rising and falling pulse transition times in order to reduce the received or end of line waveform distortion significantly (column 4 lines 63-65). As such, it is clear that one skilled in the art, in seeking a means or method for making dynamic or automating the optimization process disclosed by both Marcuse and Clow, would have turned to Clow's method of providing feedback from the receiving end of the system for adjusting the rising and falling pulse transition times, without departing from the spirit of scope of either invention.

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The applicant argues that in Marcuse the rise and fall time are fixed after being initially set, and therefore Marcuse fails to suggest or teach that the rising and falling pulse transition times are adjusted after being initially set. However, the examiner disagrees. The entire focus of Marcuse is to reduce the rising and falling pulse transition times in order to reduce pulse spreading at the receiver. As such, it is clear that upon input of a new signal to the system of Marcuse the rising and falling pulse transition times would have to be adjusted manually a plurality of times before an acceptable level of pulse spreading were detected at the receiving end of the system. It is highly unlikely that an operator of the system of Marcuse would achieve the desired result of minimized pulse spread with an initial setting of the system. The examiner further believes that the tedium of experimenting to find the rising and falling pulse transition

times which achieve the desired result would lead one skilled in the art to disclosures like Clow which rely on feedback from the receiver.

****

The applicant argues that Clow is only related to transmission of electrical signals through wire transmission paths. However, the examiner disagrees. As stated in previous office actions, Clow clearly contemplates other forms of transmission mediums by disclosing that the type of transmission medium is not limited to those disclosed (column 3 lines 51-52). Given the replacement of electrical communication systems with optical communication systems particularly around the date of the patent granted to Clow, and Clow's contemplation of other forms of transmission media, it is clear that the disclosure of Clow sought not to limit the invention only to wire media. Rather, Clow saw the applicability of the invention to future media, which at the time pointed to optical media. Furthermore, at the core of both Clow's and Marcuse's invention is the desire to reduce the rising and falling pulse transition times of an electrical pulse in order to achieve optimum communication of information regardless of the medium used. Chirp and pulse broadening are common to all transmission media whether they be wire, fiber, or free-space. As such, a means for reduction of this type of signal degradation in an electrical medium is equally applicable to an optical medium. Proof of this lies in the fact that both Clow and Marcuse seek the same goal in adjusting the rising and falling pulse transition times, namely the reduction of pulse broadening or waveform distortion.

****

Next, the applicant argues that Clow relates to the transmission of electrical signals while Marcuse relates to the transmission of optical signals, and the references should therefore not be

combined. However, the examiner points out that both electrical signals and optical signals are commonly electromagnetic waves, albeit at different frequencies. The difference in frequency aside, optical signals and electrical signals are bound by the same fundamental principles that govern electromagnetic waves. Therefore, methods applied to one form of electromagnetic wave are equally applicable to other forms of electromagnetic energy. Furthermore, both Clow and Marcuse seek to address the same problem of pulse broadening in a transmission medium by reducing the rising and falling pulse transition times of an electrical input pulse in order to achieving optimum communication of information.

****

The applicant argues that Clow does not include any disclosure indicating that a carrier or modulator is involved. However, the examiner disagrees. The fact that Clow discloses that "information" is carried through the wire is definitive proof of the existence of a modulator in the system. The examiner cannot think of a single instance where information is sent from one point to another without modulation of a carrier taking place. Whether it be by phase modulation, amplitude modulation, frequency modulation, when information is transmitted from one point to another a carrier is most certainly modulated. Furthermore, Clow's disclosure of rise time and fall times point to a carrier being modulated with information. Moreover, Figures 2-6 by definition show a carrier wave that is amplitude modulated in that the amplitude of the signal changes with the transmission of information. Regardless, the examiner has met the limitation of a modulation signal generator with Marcuse and does not rely on Clow for this disclosure.

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Next, the applicant argues that Marcuse simply discloses reducing the rise and fall times of the input signal, and not lengthening both the rise and fall time as claimed. However, the examiner has relied on the combination of Marcuse and Clow to teach this limitation and not solely on Marcuse. Clow clearly teaches lengthening both the rise and the fall time of the input signal (column 2 lines 6-10). The examiner believes that one skilled in the art would have lengthened the rise and fall times of the input signal according to the disclosure of Clow if the result of at the receiver would have alleviated the pulse broadening that both Marcuse and Clow seek to address. An example of this would be when the combined system of Marcuse and Clow found, through monitoring of the received signal and feedback to the transmitter, that the pulse transmission times had been overly reduced thereby creating a distorted pulse at the receiver. The system of the combination of references would seek to cure this problem by lengthening both the rise and fall time in order to correct this situation. This is clearly provided for in the dynamic nature of the combination of references.

****

Finally, the applicant argues that it would not have been obvious to one skilled in the art to duplicate the transmitter and receiver system of the combination of Marcuse and Clow and apply the duplicated system in a wavelength division multiplexing system. The examiner disagrees and has taken the position that it would have been obvious to one of ordinary skill in the art to duplicate the device of Marcuse and Clow since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co., 193 USPQ 8*. Furthermore, the examiner maintains that multiplexing of a plurality of signals is a very well known method in the art of communication for increasing the

amount of information transmitted across a medium and has provided motivation for modifying the combination of references to that extent. The examiner believes that one skilled in the art having appreciated the combination of Clow and Marcuse could easily duplicate the essential working parts of the combination of references, then sought a method or means for efficiently transmitting the plurality of signals across a medium, namely multiplexing of signals.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Agustin Bello

AB
January 10, 2005

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